

數量方法與決策 筆記

1.4

1.8

1.9

1.10

1.15

1.4

- 可用"=" 或是< - 指派
- $x:y \rightarrow x \ x+1 \ x+2 \ \dots \ y$
- $\text{seq}(\text{from}=x, \text{to}=y, \text{by}=z) \rightarrow x \ x+z \ x+2z \ \dots \ y$
- $\text{rep}(x,y) \rightarrow$ 重複印 x , y 次
 - x 可以是數字 字串 函數 等等
- 四則運算
- 矩陣 $\rightarrow \text{matrix}(c(1,2,3,4,5,6,7,8,9), \text{nrow}=3, \text{byrow}=\text{TRUE})$
- [行,列] $\rightarrow [x,]$ 可呼叫 x 行

以下為例子：

```
> x <- c(1,3,5,7,9)

> x
[1] 1 3 5 7 9

> gender <- c("Male","Female")

> gender
[1] "Male" "Female"

> 2:7
[1] 2 3 4 5 6 7

> seq(from=1, to=7, by=1)
[1] 1 2 3 4 5 6 7

> seq(from=1,to=7, by=1/3)
[1] 1.000000 1.333333 1.666667 2.000000 2.333333 2.666667 3.000000 3.333333 3.666667
 4.000000
[11] 4.333333 4.666667 5.000000 5.333333 5.666667 6.000000 6.333333 6.666667 7.000000

> rep(1,10)
```

```

[1] 1 1 1 1 1 1 1 1 1 1

> rep("margin",5)
[1] "margin" "margin" "margin" "margin" "margin"

> rep(1:3, 5)
[1] 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3

> rep(seq(2,5,0.25),5)
[1] 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00 4.25 4.50 4.75 5.00 2.00 2.25 2.50 2.
75 3.00 3.25
[20] 3.50 3.75 4.00 4.25 4.50 4.75 5.00 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00
4.25 4.50 4.75
[39] 5.00 2.00 2.25 2.50 2.75 3.00 3.25 3.50 3.75 4.00 4.25 4.50 4.75 5.00 2.00 2.25
2.50 2.75 3.00
[58] 3.25 3.50 3.75 4.00 4.25 4.50 4.75 5.00

> rep(c("m","f"), 5)
[1] "m" "f" "m" "f" "m" "f" "m" "f" "m" "f"

> x <- 1:5
> x
[1] 1 2 3 4 5

> y <- c(1,3,5,7,9)

> x+10
[1] 11 12 13 14 15

> x
[1] 1 2 3 4 5

> y
[1] 1 3 5 7 9

> x+y
[1] 2 5 8 11 14

> xy
[1] 1 6 15 28 45

> x/y
[1] 1.0000000 0.6666667 0.6000000 0.5714286 0.5555556

> x-y
[1] 0 -1 -2 -3 -4

> y[3]
[1] 5

> y[-3]
[1] 1 3 7 9

> y[1:3]
[1] 1 3 5

> y[c(1,5)]
[1] 1 9

```

```

> y[y<6]
[1] 1 3 5

> # matrix

> matrix(c(1,2,3,4,5,6,7,8,9), nrow=3, byrow=TRUE)
[,1] [,2] [,3]
[1,] 1 2 3
[2,] 4 5 6
[3,] 7 8 9
>
> matrix(c(1,2,3,4,5,6,7,8,9), nrow=3, byrow=FALSE)
[,1] [,2] [,3]
[1,] 1 4 7
[2,] 2 5 8
[3,] 3 6 9
> mat <- matrix(c(1,2,3,4,5,6,7,8,9), nrow=3, byrow=FALSE)
> mat
[,1] [,2] [,3]
[1,] 1 4 7
[2,] 2 5 8
[3,] 3 6 9
>
> mat[1,2]
[1] 4
>
> mat[c(1,2),3]
[1] 7 8
>
> mat[2,]
[1] 2 5 8
> mat[,1]
[1] 1 2 3
>
> mat10
[,1] [,2] [,3]
[1,] 10 40 70
[2,] 20 50 80
[3,] 30 60 90

rm()

```

1.8

- 可用兩種方式抓取某一個variable, 第一個是先attach data, 第二是加 \$
- summary(dataset)

以下為例子：

```

> data <- read.csv(file.choose(),header =T)

```

可用兩種方式抓取某一個variable, 第一個是先attach data, 第二是加 \$

```
## method 1
> levels(data$Gender)[1]
"female" "male"

## method 2
> attach(data)
> levels(Gender)
"female" "male"

> summary(data)
LungCap Age Height Smoke Gender
Min. : 0.507 Min. : 3.00 Min. :45.30 Length:725 female:358
1st Qu.: 6.150 1st Qu.: 9.00 1st Qu.:59.90 Class :character male :367
Median : 8.000 Median :13.00 Median :65.40 Mode :character
Mean : 7.863 Mean :12.33 Mean :64.84
3rd Qu.: 9.800 3rd Qu.:15.00 3rd Qu.:70.30
Max. :14.675 Max. :19.00 Max. :81.80
Caesarean
Length:725
Class :character
Mode :character

> summary(Age)
Min. 1st Qu. Median Mean 3rd Qu. Max.
3.00 9.00 13.00 12.33 15.00 19.00
```

1.9

- `dim()` → dimension of a data
- `length()`
- 可以加條件 `mean(Age[Gender == "female"])`

以下為例子：

```
> dim(data)
[1] 725 6
>
> length(Age)
[1] 725
>
> Age[11:24]
[1] 19 17 12 10 10 13 15 8 11 14 6 8 16 11
>
> data[11:24,]
LungCap Age Height Smoke Gender Caesarean
11 11.500 19 76.4 no male yes
12 10.925 17 71.7 no male no
13 6.525 12 57.5 no male no
14 6.000 10 61.1 no female no
15 7.825 10 61.2 no male no
16 9.525 13 63.5 no male yes
```

```

17 7.875 15 59.2 no male no
18 5.050 8 56.1 no male no
19 7.025 11 61.2 yes female no
20 9.525 14 70.6 no female no
21 3.975 6 57.3 no male no
22 5.325 8 59.7 no female no
23 10.025 16 72.4 no male no
24 8.725 11 68.0 no male yes
>
> class(Age)
[1] "integer"
> class(Gender)
[1] "character"
> Gender <- as.factor(Gender)
>
> mean(Age[Gender == "female"])
[1] 12.44972
>
> femdata <- data[Gender=="female",]
> ## 只有女生的資料
>
> dim(femdata)
[1] 358 6
>
> summary(Gender)
female male
358 367
>
> MaleOver15 <- data[Gender=="male" & Age>15,]
>
> summary(MaleOver15)
LungCap Age Height Smoke Gender Caesarean
Min. : 6.45 Min. :16.00 Min. :66.20 Length:89 female: 0 Length:89
1st Qu.:10.28 1st Qu.:16.00 1st Qu.:71.10 Class :character male :89 Class :character
Median :11.07 Median :17.00 Median :73.50 Mode :character Mode :character
Mean :11.10 Mean :17.31 Mean :73.64
3rd Qu.:12.12 3rd Qu.:18.00 3rd Qu.:75.90
Max. :14.68 Max. :19.00 Max. :81.80
>
> MaleOver15[1:4,]
LungCap Age Height Smoke Gender Caesarean
11 11.500 19 76.4 no male yes
12 10.925 17 71.7 no male no
23 10.025 16 72.4 no male no
40 11.325 17 77.7 no male no

```

1.10

- `as.numeric()` → 將 true and false 改成 0 and 1
- `cbind()` → 將兩個data合起來

以下為例子：

```

> Age5 <- Age[1:5]
> Age5
[1] 6 18 16 14 5
>
> Age5>15
[1] FALSE TRUE TRUE FALSE FALSE
>
> yemp <- as.numeric(Age5>15)
>
> yemp
[1] 0 1 1 0 0
>
> data[1:5,]
LungCap Age Height Smoke Gender Caesarean
1 6.475 6 62.1 no male no
2 10.125 18 74.7 yes female no
3 9.550 16 69.7 no female yes
4 11.125 14 71.0 no male no
5 4.800 5 56.9 no male no
>
> FemSmoke <- Gender=="female"& Smoke == "yes"
>
> FemSmoke[1:5]
[1] FALSE TRUE FALSE FALSE FALSE
>
> MoreData <- cbind(data,FemSmoke)
> MoreData [1:5,]
LungCap Age Height Smoke Gender Caesarean FemSmoke
1 6.475 6 62.1 no male no FALSE
2 10.125 18 74.7 yes female no TRUE
3 9.550 16 69.7 no female yes FALSE
4 11.125 14 71.0 no male no FALSE
5 4.800 5 56.9 no male no FALSE

```

1.15

- 套用函數 → 像是 `ACG <- apply(X=StockData, MARGIN=2, FUN=mean, na.rm = T)`
- 話術線圖 `plot()` → `plot(apply(X=StockData, MARGIN = 1, FUN=sum, na.rm=T), type="l", ylab="y", xlab="x", main="title")`

以下為例子：

```

stockData <- read.table(file.choose(), sep=",", header=T, row.names=1)
> View(stockData)
> apply(X=stockData, MARGIN=2, FUN=mean)
stock1 stock2 stock3 stock4
163.746 NA 1523.000 91.571
> apply(X=stockData, MARGIN=2, FUN=mean, na.rm = T)
stock1 stock2 stock3 stock4
163.746000 1.463333 1523.000000 91.571000
>

```

```
> ACG <- apply(X=StockData, MARGIN=2, FUN=mean, na.rm = T)

rowSums(StockData, na.rm=T)

plot(apply(X=StockData, MARGIN = 1, FUN=sum, na.rm=T), type="l", ylab="y", xlab="x", main
="title")
> points(apply(X=StockData, MARGIN = 1, FUN=sum, na.rm=T), pch=16, col="blue")
```